

## What is claimed is:

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Apparatus for filtering and amplifying a received signal comprising:

5 a plurality of sequentially connected complex filter/amplifier stages, each stage having:

- complex filter means for attenuating an interfering portion relative to a desired portion of the received signal;
- controlled amplifier means having set minimum gain  $K_{\min}$  and maximum gain  $K_{\max}$  for amplifying the received signal; and
- control means for controlling the amplifier gain  $K$  where  $K_{\min} \leq K \leq K_{\max}$  such that the controlled amplifier seeks to generate an output signal having a projected amplitude level.

2. Apparatus as claimed in claim 1 wherein the received signal is in the IF band.

3. Apparatus as claimed in claim 2 wherein the received signal is at a low intermediate frequency (LIF).

4. Apparatus as claimed in claim 2 wherein the received signal is at a substantially zero intermediate frequency (ZIF).

5. Apparatus as claimed in claim 1 wherein the complex bandpass filter means filters the received signal and the amplifier means is connected to the filter means to amplify the filtered received signal.

6. Apparatus as claimed in claim 1 wherein the received signal comprises complex in-phase I and quadrature phase Q signals.

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7. Apparatus as claimed in claim 6 wherein each of the complex filter means includes up to two poles.

5 8. Apparatus as claimed in claim 6 wherein the complex filter means comprises one or more single pole complex filters connected in series.

9. Apparatus as claimed in claim 6 wherein the controlled amplifier means comprises:

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- a first variable gain amplifier for amplifying the in-phase I signal; and
- a second variable gain amplifier for amplifying the quadrature phase Q signal, wherein the control means generates a gain control signal for controlling the gain of the first and second amplifiers.

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10. Apparatus as claimed in claim 9 wherein the control means determines the control signal as a function of the I and Q inputs to the amplifiers.

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11. Apparatus as claimed in claim 9 wherein the control means determines the control signal as a function of the I and Q outputs of the amplifiers.

12. Apparatus as claimed in claim 9 wherein the control means determines the control signal as a function of the projected amplitude level.

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13. Apparatus as claimed in claim 9 wherein the control means comprises:

- a first rectifier for receiving the output of the first variable amplifier to provide a first rectified signal;

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- a second rectifier for receiving the output of the second variable amplifier to provide a second rectified signal;
- summing means for adding the first and the second rectified signals; and
- error amplifier means having a first input coupled to the summing means and a second input coupled to a projected amplitude level signal for producing the gain control signal.

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14. Apparatus as claimed in claim 13 wherein the first and second rectifiers are full wave rectifiers.

15. Apparatus as claimed in claim 9 wherein the control means comprises:

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- a first rectifier for receiving the input of the first variable amplifier to provide a first rectified signal;
- a second rectifier for receiving the input of the second variable amplifier to provide a second rectified signal;
- summing means to add the first and the second rectified signals; and
- error amplifier means having a first input coupled to the summing means and a second input coupled to a projected amplitude level signal for producing the gain control signal.

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16. Apparatus as claimed in claim 15 wherein the first and second rectifiers are full wave rectifiers.

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17. Apparatus as claimed in claim 9 further comprising:

received signal strength indicator having:

- gain summation means for receiving the gain control signal from each of the complex filter/amplifier stages for computing the overall gain of the apparatus;
- means for detecting the amplitude of the apparatus output signal; and
- means coupled to the gain summation means and the detector means for indicating the strength of a desired signal received by the apparatus.

18. Apparatus as claimed in claim 1 wherein each complex filter/amplifier stage further includes a dc compensation circuit for attenuating the dc offset of the received signal.

19. Apparatus as claimed in claim 18 wherein the dc compensation circuit is a feedback circuit.

20. Apparatus as claimed in claim 18 wherein the dc compensation circuit is a feedforward circuit.

21. Apparatus as claimed in claim 1 wherein  $K_{\min}$  is negative.

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